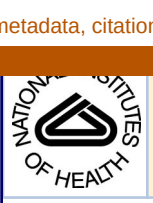

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Parents' and Sons' Beliefs in Sexual Disinhibition After Human Papillomavirus Vaccination

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Abstract

Background—The concern that adolescent girls who receive human papillomavirus (HPV) vaccine may be more likely to have sex (ie, sexual disinhibition) has been commonplace in media coverage, but this belief is not held by many parents of adolescent girls. Because no studies have addressed this topic for adolescent boys, we examined parents' and their adolescent sons' beliefs in sexual disinhibition occurring after boys receive HPV vaccine.

Methods—A national sample of parents of adolescent boys (n = 547) and their sons (aged 15–17 years; n = 176) completed online surveys in fall 2010. We used multi-item scales to measure parents' and sons' beliefs in sexual disinhibition after HPV vaccination. We used multivariate linear regression to identify correlates of beliefs in sexual disinhibition.

Results—Less than a quarter of parents or sons agreed with statements suggesting that HPV vaccination leads to sexual disinhibition among adolescent boys (range, 20%–24%). Parents who had more liberal political affiliations (β = −0.11), had a daughter who had received HPV vaccine (β = −0.12), or had no daughter (β = −0.10) reported weaker beliefs in sexual disinhibition. Parents who reported higher anticipated regret if their sons got HPV vaccine and fainted (β = 0.18) indicated stronger beliefs in sexual disinhibition. Sons who perceived higher peer acceptance of HPV vaccination (β = 0.44) or were Hispanic (β = 0.21) had stronger beliefs in sexual disinhibition.

Conclusions—Most parents and sons did not believe that HPV vaccination leads to sexual disinhibition among boys. Understanding the characteristics of parents and sons who hold these beliefs may help inform efforts to increase HPV vaccine uptake among boys.

Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the United States, with an estimated 6.2 million new infections each year.[1] Human

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papillomavirus vaccine, which was first recommended for females in the United States,[2] is now also recommended for males to prevent genital warts and anal cancer. As of October 2011, national guidelines recommend that all adolescent boys aged 11 to 12 years receive the 3-dose HPV vaccine regimen, with catch-up vaccination for boys and men aged 13 to 21 (and through age 26 years for men who have sex with men).[3] However, vaccine coverage remains extremely low among adolescent boys, with recent data suggesting that 14% or fewer adolescent boys have received any doses of the vaccine.[4–6] Increasing HPV coverage among adolescent boys is important because vaccination may play an important role in curbing rising rates of genital warts and HPV-related cancers among men.[7]

One much discussed potential barrier to increasing coverage is the belief that HPV vaccination may cause adolescents to engage in sexual behavior (ie, sexual disinhibition). This folk belief may arise because of the link between the vaccine and HPV, an STI. Another source may be media stories about the vaccine.[8,9] Despite the popularity of this topic in public discourse, past studies have shown that only 6% to 31% of parents with adolescent daughters believe that sexual disinhibition will occur among vaccinated girls.[10–15] Furthermore, a British study of adolescent girls found that around 30% agreed that HPV vaccination would make adolescent girls more likely to have sex.[12]

The veracity and impact of such beliefs have been the topic of considerable research. Multiple well-designed studies have found that HPV vaccination is not associated with markers of sexual behavior among adolescent girls, including rates of STIs and pregnancy.[16,17] Although concerns about this issue seem to correlate with lower interest in vaccinating adolescent girls against HPV in cross-sectional studies,[18,19] our own longitudinal work showed that such beliefs are the result of not vaccinating, not a cause of it.[20] Data from this same study indicated that less than 1% of parents showed concerns about sexual disinhibition as their main reason for not having vaccinated their adolescent daughters.[21]

No studies, to our knowledge, have examined parents' and adolescents' beliefs in sexual disinhibition among boys after HPV vaccination. The present study uses data from a national sample of parents and their adolescent sons to determine the prevalence of this belief and identify correlates of having this belief. Based on our previous research among parents of adolescent girls,[14] we hypothesized that parents who were younger and more liberal in their political views would have weaker beliefs in sexual disinhibition occurring among boys who receive HPV vaccine. We also hypothesized that sons with higher knowledge about HPV would be less likely to agree with the notion that HPV vaccine may cause sexual disinhibition.

MATERIALS AND METHODS

Study Design

The HPV Immunization in Sons study surveyed parents and their 11- to 17-year-old sons to examine their attitudes and beliefs in HPV vaccination for boys.[22] We recruited parents from a national online panel maintained by a survey company.[23] The online panel is constructed through list-assisted, random-digit dialing supplemented by address-based

sampling. The resulting panel represents a probability-based sample of US households. Panel members receive a laptop and free Internet access in exchange for completing multiple online surveys each month. Panel members in households with existing computer and Internet access accumulate points for completing surveys that can later be redeemed for small cash payments.

We asked participating parents to also allow their sons to participate in our study. Any parent with multiple sons in the eligible age range answered questions about the son with the most recent birthday who then became eligible for participation in the study. Parents provided consent to participate for both themselves and their sons before the start of parent surveys, and sons provided assent before the start of their surveys. Sons received 5000 points (equivalent to approximately US $5) for completing the survey. The survey company e-mailed 1195 adults, who likely had age-eligible male children, to invite them to complete baseline surveys. Among the 752 parents who responded, 73% (n = 547) were eligible and completed the parent survey, and 56% (n = 421) had sons who completed the son survey. We report data on all parents who completed surveys and 176 sons aged 15 to 17 years because sexual disinhibition items were not asked of younger sons.

Measures

Surveys for the HPV Immunization in Sons study are available online at http://www.unc.edu/~ntbrewer/hpv.htm. We developed survey items based on our previous HPV vaccine survey research.[24–26] We cognitively tested survey items (with 6 parents and 6 sons), refined the items, and then pretested the surveys (with 31 parents and 23 adolescent sons) before data collection.

Outcome Variables—Surveys assessed parents' (3 items, $\alpha = 0.76$) and sons' (2 items, $\alpha = 0.83$) beliefs in sexual disinhibition occurring after HPV vaccination. Survey items for parents/sons read the following: (1) "If [son's name/I] got the HPV vaccine, [his] girlfriends would think it was safe to take more risks," and (2) "If [son's name/I] got the HPV vaccine, [he/I] would think it was safe to take more risks." We modified items used in past HPV vaccine research in creating these 2 items.[27] The survey asked parents a third sexual disinhibition item, "If a teenage boy gets the HPV vaccine, he may be more likely to have sex." The 5-point scale used for disinhibition items read "strongly disagree," "disagree," "not sure," "agree," and "strongly agree" (coded 1–5).

Correlates—We have previously described the survey items examined as potential correlates.[22] Surveys assessed parents' worry about their sons getting HPV-related disease, perceived likelihood of their sons getting HPV-related disease, and perceived effectiveness of HPV vaccine against genital warts (all items had a possible range = 1–4). We asked parents if they had heard of HPV before today, if they thought their sons' insurance covered HPV vaccine, and if their sons' doctors had ever recommended HPV vaccine for their sons. Surveys assessed parents' comfort in talking with their sons about new vaccines (2 items, $\alpha = 0.68$, possible range = 1–5) and the amount they had discussed HPV vaccine with their sons (possible range = 1–4). Surveys assessed parents' anticipated regret if their sons fainted

after receiving HPV vaccine as well as anticipated regret if their sons did not get vaccinated and later developed an HPV infection (both items had a possible range = 1–4).

We used several survey items from the Carolina HPV Immunization Attitudes and Beliefs Scale.[28] Items from this scale measured parents' perceived barriers to getting their sons HPV vaccine (2 items, $\alpha = 0.62$, possible range = 1–3) and uncertainty about HPV vaccine (3 items, $\alpha = 0.55$, possible range = 1–5). We determined if sons had received any doses of HPV vaccine and if sons had any female siblings aged 9 to 26 years who had received any doses of HPV vaccine.

The son survey included 5 items that we used to classify sons as follows: (*a*) unaware of HPV (never heard of HPV before the survey), (b) aware with low HPV knowledge (answered 2 or fewer knowledge items correctly), or (c) aware with high knowledge (answered 3 or more knowledge items correctly). We measured sons' perceived knowledge about HPV vaccine (possible range = 1–4), potential embarrassment if they got vaccinated (2 items, $\alpha = 0.90$, possible range = 1–5), and peer acceptance of HPV vaccine (4 items, $\alpha = 0.69$, possible range = 1–5). We used items and response scales that corresponded to those on the parent survey to measure sons' perceived likelihood of HPV-related disease (possible range = 1–4), comfort in talking with their parents about new vaccines (2 items, $\alpha = 0.71$, possible range = 1–5), the amount they had talked with their parents about HPV vaccine (possible range = 1–4), anticipated regret if they received HPV vaccine and fainted (possible range = 1–4), and anticipated regret if they did not receive HPV vaccine and later developed an HPV infection (possible range = 1–4).

We collected information on several demographic variables (Table 1). We defined "rural" as living outside a metropolitan statistical area and "urban" as living inside of a metropolitan statistical area. We asked parents if they considered themselves to be born-again or evangelical Christians. Surveys measured parents' political affiliation (responses ranging from "very conservative" to "very liberal"; possible range = 1–5) and importance of religion (responses ranging from "not at all important" to "extremely important"; possible range = 1–5).

Data Analysis

We used linear regression to identify bivariate correlates of parents' and sons' beliefs in sexual disinhibition occurring after HPV vaccination. We entered statistically significant correlates ($P < 0.05$) into separate multivariate linear regressions for parents and sons. We report standardized regression coefficients (β) from these analyses. We calculated Pearson correlation coefficient to determine correlations between parents' and sons' beliefs in sexual disinhibition and used paired *t* tests to make comparisons. Analyses used SPSS version 17.0 (SPSS Inc, Chicago IL), with all statistical tests being 2 tailed and having a critical α of 0.05.

RESULTS

Participant Characteristics

Parents were mostly female (54%), younger than 45 years (61%), non-Hispanic white (67%), and were married or living with a partner (82%) (Table 1). Approximately half of parents had completed at least some college (56%) and reported a household income of less than US$60,000 (51%). Parents were from all 4 geographic regions of the United States, with most residing in urban areas (83%). Most parents had heard of HPV before the survey (79%). Sons included in these analyses were aged 15 to 17 years and mostly non-Hispanic white (66%). More than half of sons had not heard of HPV before the survey (60%), 15% had heard of HPV and had low knowledge about it, and 25% had heard of HPV and had high knowledge.

Parents' Sexual Disinhibition Beliefs

Parents reported modest beliefs that HPV vaccine would cause sexual disinhibition among boys who receive it (mean [SD], 2.76 [0.83]). With respect to individual scale items, approximately 20% of parents strongly agreed or agreed that teenage boys who get HPV vaccine maybe more likely to have sex (Fig. 1). Similar percentages of parents strongly agreed or agreed that if their sons got HPV vaccine, his girlfriends would think it was safe to take more risks (21%) or the sons would think it was safe to take more risks (23%).

In a multivariate analyses, parents who reported higher anticipated regret if their sons got HPV vaccine and fainted ($\beta = 0.18$) indicated stronger beliefs in sexual disinhibition (Table 2). Parents who reported more liberal political affiliations ($\beta = -0.11$), had a daughter who had received HPV vaccine ($\beta = -0.12$), or did not have a daughter ($\beta = -0.10$) reported weaker beliefs in sexual disinhibition. Variables that were statistically significant in bivariate but not multivariate analyses were parent sex, perceived uncertainty about HPV vaccine, awareness of HPV, perceived barriers to getting sons HPV vaccine, if parents thought their sons' insurance covers HPV vaccine, and if sons' doctors had recommended HPV vaccination.

Sons' Sexual Disinhibition Beliefs

As with the parents, many sons did not believe that receiving HPV vaccine would lead adolescent boys to be more sexually active (mean [SD], 2.79 [0.94]). Approximately 22% of sons strongly agreed or agreed that if they received HPV vaccine, their girlfriends would think it was safe to take more risks (Fig. 1). Approximately 24% of sons strongly agreed or agreed that if they received HPV vaccine, they would think it was safe to take more risks.

In multivariate analyses, Hispanic ethnicity ($\beta = 0.21$) and perceived peer acceptance of HPV vaccine ($\beta = 0.44$) remained associated with beliefs in sexual disinhibition after HPV vaccination (Table 3). In bivariate analyses, sons' perceived likelihood of getting HPV-related disease was also associated with beliefs in sexual disinhibition.

Correlation Between Parents' and Sons' Beliefs

Among the 176 parent-son dyads who were asked sexual disinhibition questions, parent and son responses were correlated. We found a positive correlation for both belief that girlfriends would think that it was safe to take more risks after HPV vaccination among sons ($r = 0.26$, $P < 0.001$) and belief that sons would think it was safe to take more risks after HPV vaccination ($r = 0.44$, $P < 0.001$). Among these dyads, sons and parents reported similar beliefs that HPV vaccination would lead sons to think it would be safe to take more risks (means, 2.70 vs. 2.64) and would lead sons' girlfriends to think it would be safe to take more risks (means, 2.88 vs. 2.76; both $P > 0.05$).

DISCUSSION

Although studies have examined beliefs in sexual disinhibition among adolescent girls and their parents,[10–15] it is important to examine such beliefs about vaccinating boys against HPV. A minority of parents agreed that HPV vaccination could lead to sexual disinhibition among adolescent boys, with items ranging from 20% to 23% agreement. This proportion is within the range of parental agreement with sexual disinhibition resulting from HPV vaccination found among parents of adolescent girls, which ranged from 6% to 31% in past studies.[10–15] Among adolescent boys, agreement with sexual disinhibition items ranged from 22% to 24%. This proportion is somewhat comparable with the 30% of adolescent girls endorsing this belief found in one British study.[12] These findings add to the body of evidence that beliefs in HPV-induced sexual disinhibition are not held by most parents and adolescents.

Several variables among parents and sons were correlated with stronger beliefs about sexual disinhibition occurring among boys who receive HPV vaccine. Although a minority of parents and adolescent sons held this belief, these correlates identify subgroups that may hold stronger beliefs about sexual disinhibition. Such information may be useful to consider in designing messages and strategies to help increase HPV vaccination among boys. Our results support our expectation that parents with more liberal political beliefs would have weaker beliefs about sexual disinhibition. This finding is consistent with a past study that found that conservative political beliefs were associated with greater concern about sexual disinhibition occurring among adolescent girls who receive HPV vaccine.[14] Because parent age was not associated with beliefs in sexual disinhibition, our hypothesis that older parents would express stronger beliefs in sexual disinhibition was not supported. Past studies have found a null or positive association between parent age and endorsement of sexual disinhibition beliefs.[11,12,14]

Parents who had daughters who had received HPV vaccine were less likely to endorse HPV-induced sexual disinhibition beliefs. This is similar to a previous study that found that parents with daughters who had received HPV vaccine were less likely to express beliefs sexual disinhibition.[14] It is possible that the parents with vaccinated daughters in our study did not observe increased sexual activity in their daughters after HPV vaccination and are therefore less worried about sexual disinhibition occurring among their sons. Parents in our study who did not have daughters were also less likely to agree with HPV-induced sexual disinhibition compared with parents with unvaccinated daughters. This may be caused by

the fact that parents without daughters are not as aware of concerns about sexual disinhibition. Lastly, parents who anticipated greater regret if their sons were vaccinated and fainted had stronger beliefs about sexual disinhibition after HPV vaccination. These parents who anticipate higher regret if fainting occurred after vaccination may simply be more worried about other potential negative outcomes, including sexual disinhibition. Our study also provides valuable insight into correlates of beliefs about sexual disinhibition among sons. Hispanic sons were more likely to agree that HPV vaccine may lead to sexual disinhibition.

It may be important to address this belief among Hispanic males because they are more likely to be infected with multiple HPV types as compared with non-Hispanic whites.[29] However, early data suggest that Hispanic boys have higher HPV vaccine initiation rates, so sexual disinhibition beliefs among Hispanic boys may not actually reduce their uptake of HPV vaccine.[6] Perceived peer acceptance of HPV vaccine was positively associated with beliefs in HPV-induced sexual disinhibition, suggesting that boys might not see sexual disinhibition as an especially bad thing.

The present study has many strengths including a national sample and interviews with both parents and their adolescent sons. We cognitively tested our surveys before data collection, which may have contributed to the sexual disinhibition scales having good internal consistency. Study limitations include the inability to compare vaccinated and unvaccinated sons on beliefs about sexual disinhibition because so few sons had received any doses of HPV vaccine. Most participants were non-Hispanic white and of higher socioeconomic status, although the online panel our sample was drawn from is demographically similar to the US population.[30] Panel members received incentives to regularly complete online surveys, which may have affected responses to our survey items. In addition, our surveys were conducted in fall 2010, about a year before the HPV vaccine was recommended for routine use among adolescent boys.[3] It is possible that parents' and sons' beliefs in sexual disinhibition may have changed because HPV vaccine has been available for a longer period for adolescent boys.

Most parents and adolescent sons did not believe that HPV vaccination leads to sexual disinhibition among adolescent boys. Certain subgroups of parents (eg, those who have conservative political beliefs) and sons (eg, Hispanics) may hold stronger beliefs about sexual disinhibition. This information may be helpful to practitioners developing messages and strategies to increase HPV vaccination.

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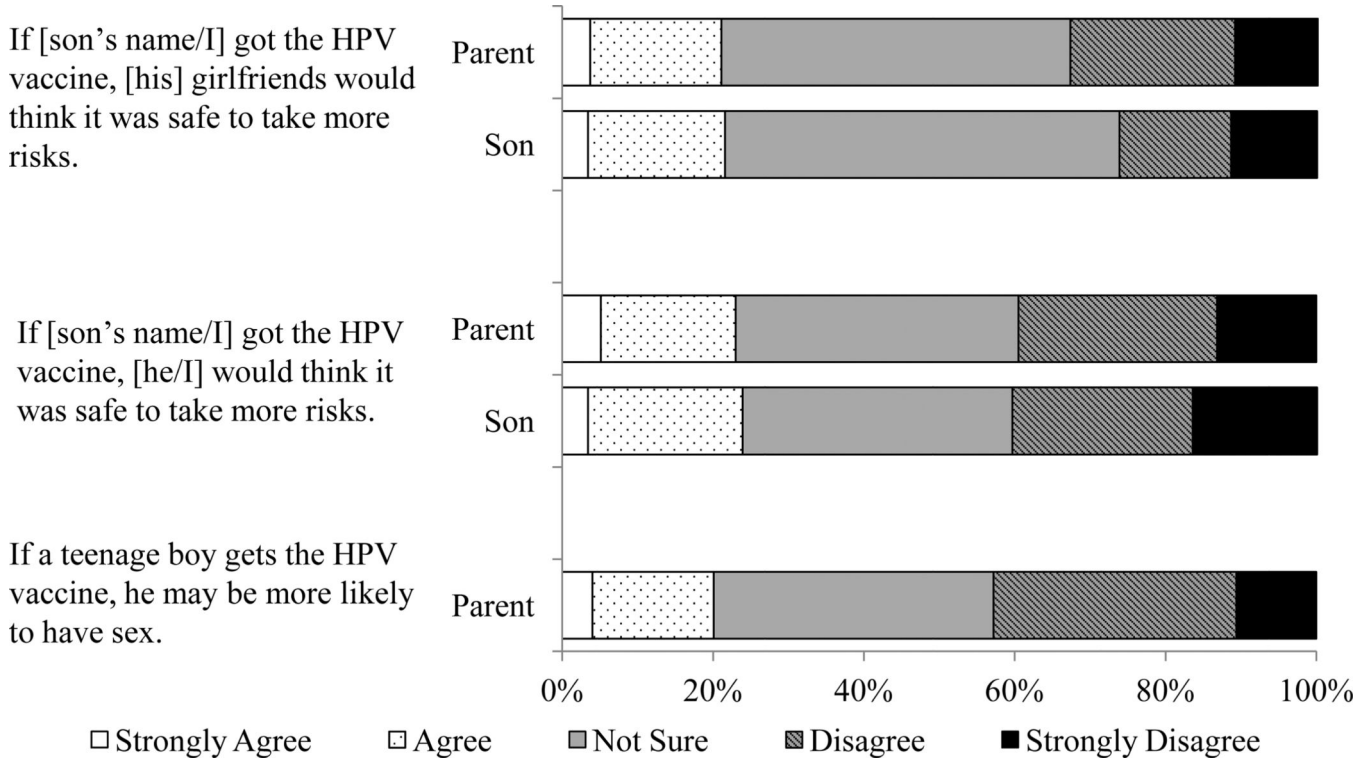

Figure 1.
Parent and son responses to sexual disinhibition items.

TABLE 1

Characteristics of Parents (n = 547) and Their Adolescent Sons (n = 176)

	n (%)
Parent characteristics	
Sex	
Female	294 (54)
Male	253 (46)
Age, y	
<45	332 (61)
≥45	215 (39)
Race/Ethnicity	
White, non-Hispanic	366 (67)
African American, non-Hispanic	69 (13)
Hispanic	83 (15)
Other	29 (5)
Marital status	
Divorced, widowed, separated, never married	101 (19)
Married or living with partner	446 (82)
Education	
High school degree or less	242 (44)
Some college or more	305 (56)
Born-again Christian	
No	363 (66)
Yes	184 (34)
Importance of religion, mean (SD)*	3.60 (1.35)
Political Affiliation, mean (SD)†	2.62 (0.98)
Heard of HPV before survey	
No	116 (21)
Yes	431 (79)
Son characteristics‡	
Age, y	
15	41 (23)
16	62 (35)
17	73 (42)
Race/Ethnicity	
White, non-Hispanic	116 (66)
African American, non-Hispanic	23 (13)
Hispanic	28 (16)
Other	9 (5)
Seen regular health care provider in last year	
No	49 (28)
Yes	127 (72)

	n (%)
Knowledge about HPV	
Never heard of HPV before survey	105 (60)
Heard of HPV, low knowledge	27 (15)
Heard of HPV, high knowledge	44 (25)
Household characteristics	
Household income	
<US $60,000	279 (51)
≥US $60,000	268 (49)
Urbanicity	
Rural	94 (17)
Urban	453 (83)
Region of residence	
Northeast	114 (21)
Midwest	134 (25)
South	188 (34)
West	111 (20)

* Five-point response scale ranging from “not at all important” to “very important” (coded 1–5).

† Five-point response scale ranging from “very conservative” to “very liberal” (coded 1–5).

‡ Data collected during parent survey, but we report data only for those sons who completed their own surveys and were aged 15 to 17 years.

TABLE 2

Parents' Beliefs in Sexual Disinhibition After HPV Vaccination (n = 547)

	n (%)	Mean Beliefs in Sexual Disinhibition (SD)	Bivariate, β	Multivariate, β
Parent characteristics				
Sex				
Female	294 (54)	2.68 (0.82)	Ref	Ref
Male	253 (46)	2.84 (0.83)	0.10*	0.04
Age, y				
<45	332 (61)	2.75 (0.83)	Ref	—
≥45	215 (39)	2.78 (0.82)	0.02	—
Race/Ethnicity				
White, non-Hispanic	366 (67)	2.71 (0.82)	Ref	—
African American, non-Hispanic	69 (13)	2.79 (0.81)	0.03	—
Hispanic	83 (15)	2.88 (0.87)	0.07	—
Other	29 (5)	2.89 (0.87)	0.05	—
Marital status				
Divorced, widowed, separated, never married	101 (19)	2.73 (0.84)	Ref	—
Married or living with partner	446 (82)	2.76 (0.83)	0.01	—
Education				
High school degree or less	242 (44)	2.82 (0.81)	Ref	—
Some college or more	305 (56)	2.71 (0.84)	−0.07	—
Born-again Christian				
No	363 (66)	2.75 (0.82)	Ref	—
Yes	184 (34)	2.77 (0.84)	0.01	—
Importance of religion†,‡	3.60 (1.35)	N/A	0.08	—
Political affiliation†,§	2.62 (0.98)	N/A	−0.13¶	−0.11¶
Son characteristics				
Age, y				
11–12	172 (31)	2.80 (0.81)	Ref	—
13–15	198 (36)	2.78 (0.86)	−0.01	—
16–17	177 (32)	2.69 (0.81)	−0.07	—
Seen regular health care provider in last year				
No	120 (22)	2.74 (0.75)	Ref	—
Yes	427 (78)	2.76 (0.85)	0.01	—
Received any doses of HPV vaccine				
No	535 (98)	2.76 (0.83)	Ref	—
Yes	12 (2)	2.61 (0.93)	−0.03	—
Household characteristics				
Household income				
<US $60,000	279 (51)	2.78 (0.82)	Ref	—
≥US $60,000	268 (49)	2.73 (0.84)	−0.03	—

	n (%)	Mean Beliefs in Sexual Disinhibition (SD)	Bivariate, β	Multivariate, β
Urbanicity				
Rural	94 (17)	2.77 (0.84)	Ref	—
Urban	453 (83)	2.75 (0.83)	−0.01	—
Region of residence				
Midwest	134 (24)	2.77 (0.78)	Ref	—
Northeast	114 (21)	2.76 (0.87)	−0.01	—
South	188 (34)	2.75 (0.89)	−0.01	—
West	111 (20)	2.74 (0.74)	−0.02	—
HPV and HPV vaccine				
Heard of HPV before survey				
No	166 (21)	3.00 (0.83)	Ref	Ref
Yes	431 (79)	2.69 (0.82)	−0.15¶	−0.07
Worry about son getting HPV-related disease†,//	1.44 (0.75)	N/A	−0.06	—
Perceived likelihood of son getting HPV-related disease†,**	2.18 (0.63)	N/A	−0.02	—
Has a daughter who has received HPV vaccine				
No	200 (37)	2.90 (0.91)	Ref	Ref
Yes	77 (14)	2.52 (0.77)	−0.16¶	−0.12¶
Does not have a daughter	270 (49)	2.71 (0.77)	−0.11*	−0.10*
Comfort talking with son about new vaccines†,††	4.36 (0.79)	N/A	−0.07	—
Amount talked with son about HPV vaccine†,//	1.20 (0.53)	N/A	−0.06	—
Thinks son's insurance covers HPV vaccine				
No	57 (10)	2.88 (0.80)	Ref	Ref
Yes	120 (22)	2.61 (0.83)	−0.13*	−0.03
Don't know	370 (68)	2.79 (0.83)	−0.05	0.02
Son's doctor said son should get HPV vaccine				
No	523 (96)	2.77 (0.82)	Ref	Ref
Yes	24 (4)	2.43 (0.88)	−0.09*	−0.06
Perceived effectiveness of HPV vaccine†,//	2.40 (0.94)	N/A	−0.04	—
Perceived uncertainty of HPV vaccine†,‡‡	3.57 (0.67)	N/A	0.10*	0.04
Perceived barriers to getting son HPV vaccine†,§§	1.35 (0.47)	N/A	0.09*	0.04
Anticipated regret if son got HPV vaccine and fainted†,//	2.72 (1.07)	N/A	0.21¶	0.18¶
Anticipated regret if son didn't get HPV vaccine and later got HPV infection†,//	3.16 (0.95)	N/A	−0.07	—

Sexual disinhibition was measured using 3 items (α = 0.76) that each had a 5-point response scale ranging from "strongly disagree" to "strongly agree" (coded 1–5). β represents standardized regression coefficients. Multivariate model did not include variables with dashes (—).

*$P < 0.05$.

†Continuous variable with overall mean (SD) reported.

‡Five-point response scale ranging from "not at all important" to "very important" (coded 1–5).

§ Five-point response scale ranging from “very conservative” to “very liberal” (coded 1–5).

¶ $P < 0.001$.

‖ Four-point response scale ranging from “not at all” to “a lot” (coded 1–4).

** Four-point response scale ranging from “no chance” to “high chance” (coded 1–4).

†† Two-item scale; each item had a 5-point response scale ranging from “very uncomfortable” to “very comfortable” (coded 1–5).

‡‡ Three-item scale; each item had a 5-point response scale ranging from “strongly disagree” to “strongly agree” (coded 1–5).

§§ Two-item scale; each item had a 3-point response scale ranging from “not hard at all” to “very hard” (coded 1–3).

Ref indicates referent group; N/A, not applicable due to variable being continuous.

TABLE 3

Sons' Beliefs in Sexual Disinhibition After HPV Vaccination (n = 176)

	n (%)	Mean Beliefs in Sexual Disinhibition (SD)	Bivariate, β	Multivariate, β
Son characteristics				
Age, y*				
15	41 (23)	2.89 (0.94)	−0.01	—
16	62 (35)	2.92 (0.86)	Ref	—
17	73 (41)	2.62 (0.99)	−0.16	—
Race/Ethnicity*				
White, non-Hispanic	116 (66)	2.79 (0.92)	0.14	0.13
African American, non-Hispanic	23 (13)	2.52 (0.91)	Ref	Ref
Hispanic	28 (16)	3.09 (1.03)	0.22†	0.21†
Other	9 (5)	2.56 (0.85)	0.01	0.01
Seen regular health care provider in last year*				
No	49 (28)	2.83 (0.92)	Ref	—
Yes	127 (72)	2.78 (0.95)	−0.02	—
Self-rated health‡,§	3.91 (0.91)	N/A	−0.10	—
Received any doses of HPV vaccine*				
No	171 (97)	2.79 (0.94)	Ref	—
Yes	5 (3)	2.70 (1.10)	−0.02	—
Household characteristics				
Urbanicity				
Rural	31 (18)	2.98 (0.94)	Ref	—
Urban	145 (82)	2.75 (0.94)	−0.10	—
Region of residence				
South	54 (31)	2.61 (1.01)	Ref	—
Northeast	39 (22)	2.82 (1.10)	0.09	—
Midwest	50 (28)	2.89 (0.70)	0.13	—
West	33 (19)	2.89 (0.95)	0.12	—
HPV and HPV vaccine				
Knowledge about HPV				
Never heard of HPV before survey	105 (60)	2.81 (0.87)	Ref	—
Heard of HPV, low knowledge	27 (15)	2.78 (1.03)	−0.01	—
Heard of HPV, high knowledge	44 (25)	2.74 (1.06)	−0.04	—
Perceived likelihood of getting HPV-related disease‡,¶	2.09 (0.65)	N/A	0.17†	0.11
Has a sister who has received HPV vaccine*				
No	65 (37)	2.73 (1.04)	Ref	—
Yes	31 (18)	2.89 (0.67)	0.06	—
Does not have a sister	80 (45)	2.80 (0.95)	0.04	—

	n (%)	Mean Beliefs in Sexual Disinhibition (SD)	Bivariate, β	Multivariate, β
Comfort talking with parents about new vaccines‡,//	3.66 (1.11)	N/A	−0.05	—
Amount talked with parents about HPV vaccine‡,**	1.16 (0.46)	N/A	−0.04	—
Perceived knowledge about HPV vaccine‡,††	1.39 (0.66)	N/A	−0.11	—
Perceived peer acceptance of HPV vaccine‡,‡‡	3.06 (0.59)	N/A	0.46§§	0.44§§
Potential embarrassment of getting HPV vaccine‡,¶¶	2.84 (1.02)	N/A	0.10	—
Anticipated regret if got HPV vaccine and fainted‡,**	2.59 (1.10)	N/A	−0.11	—
Anticipated regret if didn't get HPV vaccine and later got HPV infection‡,**	3.16 (0.94)	N/A	0.09	—

Sexual disinhibition was measured using 2 items (α = 0.83) that each had a 5-point response scale ranging from "strongly disagree" to "strongly agree" (coded 1–5). β represents standardized regression coefficients. Multivariate model did not include variables with dashes (—).

*Data collected during parent survey.

†$P < 0.05$.

‡Continuous variable with overall mean (SD) reported.

§Five-point response scale ranging from "poor" to "excellent" (coded 1–5).

¶Four-point response scale ranging from "no chance" to "high chance" (coded 1–4).

//Two-item scale; each item had a 5-point response scale ranging from "very uncomfortable" to "very comfortable" (coded 1–5).

**Four-point response scale ranging from "not at all" to "a lot" (coded 1–4).

††Four-point response scale ranging from "nothing at all" to "a lot" (coded 1–4).

‡‡Four-item scale; each item had a 5-point response scale ranging from "strongly disagree" to "strongly agree" (coded 1–5).

§§$P < 0.001$.

¶¶Two-item scale; each item had a 5-point response scale ranging from "strongly disagree" to "strongly agree" (coded 1–5).

Ref indicates referent group; N/A, not applicable due to variable being continuous.